"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

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TSARENKO, V., inzh.

Follow the example of outstanding engineers. NTO 5 no.2:8 F '63.
(MIRA 16:3)

1. Chlen nauchno-tekhnicheskogo obshchestva Gomel'skogo zavoda sel'skokhozyaystvennogo mashinostroyeniya.
(Engineers)

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

USSR / Farm Animals. Honey Bee

Q-7

Abs Jour: Ref Zhur-Biol., No 3, 1958, 12203

Author : Tsarenko V. P.
Inst : -------
Title : The Technique Used by I. S. Filatov and the Expediency of Strengthening Bee Families (O metode raboty I. S. Filatova i tselesoobraznosti podsilivaniya pchelinykh semey)

Orig Pub: Pchelovodstvo, 1957, No 5, 21-23

Abstract: The author argues that the strengthening of weak families is expedient not only for the sake of augmenting the number of bees but also for introducing, into a poor family, the bees distinguished by their energy and efficiency which characterize strong families. However, if the weak family does not improve, it should be culled.

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L 41599-66

ACC NR: AP6018552

2

satisfy exactly the zero boundary conditions on the two ohmic contacts. The threshold field and the frequency of these oscillations turn out to be governed by the same formulas as obtained in the earlier paper for an infinitely long sample. The threshold fields for the almost-natural oscillations is smaller than the threshold field for the true natural oscillations. If the field is smaller than critical, damped oscillations can be excited by applying to the sample an alternating field. These arise when the ohmic contacts are weakly injecting. The impedance of the sample in the latter case is investigated and it is found that it exhibits resonant properties near the frequency of the natural oscillations in the case of a short sample or near the frequency of almost-natural oscillations for the long sample. For the short sample the resonance is manifest by a single dip, whereas for a long sample it is manifest by a packet of waves. The authors thank L. E. Gurevich and V. I. Perel' for useful discussions. Orig. art. has: 3 figures and 45 formulas.

SUB CODE: 20/ SUBM DATE: 22Nov65/ ORIG REF: 002/ OTH REF: 001

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

L 22775-66 EWT(1)/EWA(h)
ACC NR: AP6010724 SOURCE CODE: UR/0142/66/009/001/0063/0070

AUTHOR: Tsarenko, V. T.; Bagrov, G. V.; Borzenko, V. V.

ORG: none

TITLE: Semiconductor waveguide attenuator with combinational electric control for shf power stabilization

SOURCE: IVUZ. Radiotekhnika, v. 9, no. 1, 1966, 63-70

TOPIC TAGS: microwave attenuator, microwave power stabilization, pn junction

ABSTRACT: A description is given of a wide-band voltage-controlled semiconductor attenuator for regulation of the shf output power level of waveguides operating on the 3-cm wavelength. The semiconductor attenuator is shown in the figure. The Ge wafer with ohmic contacts 1, 2, 3, and rectifying contact 4 form a distributed p-n junction. To reduce the ripple of the attenuation-frequency characteristic and the initial losses, the wafer thickness is less than the skin depth of the uhf field in the semiconductor (i.e., 0.6 mm). The wafer may be mounted either perpendicular to or parallel to the longitudinal axis of the waveguide (see Fig. 1). Voltage potential $E_T$ is applied between contacts 1 and 2, and a field is created, causing the flow of current $I_f$

 UDC: 621.372.85..39

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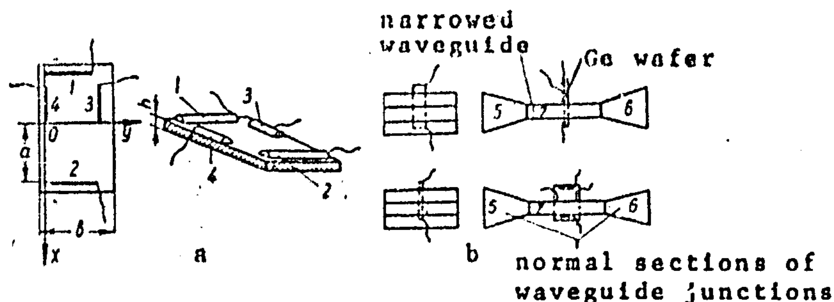


Fig. 1. Attenuator construction (a) and mounting in waveguide (b)

in the forward direction between contacts 3 and 4. Passage of current $I_f$ through the p-n junction causes the holes to be injected into the sample. As a result, excess carrier concentration arises in the p-n junction. Due to the gradient of carrier concentration along the length of sample, the holes partially diffuse into the region inside the waveguide. Voltage $E_T$ accelerates the motion of the holes and increases their diffusion length. The lifetime of the holes becomes sufficiently long for them to reach point x = a (Fig. 1a). This causes a substantial increase of sample conductivity and, indirectly, the attenuation of the electromagnetic wave as it passes through the semi-



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ACC NR: AP6010724

conductor sample. Test results indicate that the transmission factor does not vary by more than 3 db in a 20% frequency band. The speed of response of the device operating in the pulsed mode was 200—220 μsec for $E_T$ = 0 and 20—30 μsec for $E_T$ = 2v/cm. The attenuation characteristic $S_v = d\alpha/dI_f$ (α, attenuation) was 300—600 per amp for optimum $E_T$. The maximum dynamic range of the attenuator was 20 db. The attenuator may be effectively used in automatic systems requiring high-speed shf power level regulation, shf detectors, and directional couplers. The two control signals are the error signal and its differential. Orig. art. has: 4 figures and 2 formulas. [BD]

SUB CODE: 09/ SUBM DATE: 04Feb65/ ORIG REF: 005/ OTH REF: 006
ATD PRESS: 4229

Card 3/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

L 21516-66 EWA(h)/EWT(1)

ACC NR: AP6003566 SOURCE CODE: UR/0109/66/011/001/0158/0161

AUTHOR: Tsarenko, V. T.; Valitov, R. A.

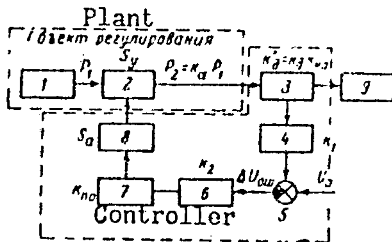
ORG: none

TITLE: Calculation of SHF-power stabilizers

SOURCE: Radiotekhnika i elektronika, v. 11, no. 1, 1966, 158-161

TOPIC TAGS: SHF attenuator, SHF power stabilizer

ABSTRACT: A method of calculation is suggested for a broadband SHF-power stabilizer based on an electrically-controlled semiconductor attenuator. The SHF-generator-stabilizer-load system is treated as an automatic controller and a plant, and the equations describing both are set up. Essentially, the system (see figure) comprises the following parts: 1 - SHF oscillator; 2 - controllable attenuator; 3 - directional coupler and crystal detector; 4 - first amplifier; 5 - comparison circuit; 6 - second amplifier; 7 - pulse detector; 8 - single-stage d-c amplifier; 9 - load. A graphoanalytical




Card 1/2 UDC: 621.316.722.029.64.001.24

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L 21670-66
ACC NR: AP6003566

procedure for calculating the stabilizer parameters is given. An experimental verification of the procedure showed a difference between the theoretical and experimental stabilization characteristics of 0.06 db. Orig. art. has: 2 figures, 14 formulas, and 1 table.

SUB CODE: 09 / SUBM DATE: 25Jan65 / ORIG REF: 003

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

VALITOV, R.A.; DOMANOVA, Ye.A.; TSARENKO, V.T.

Device for stabilizing the power of microwave oscillations in a wide frequency range. Radiotekh. i elektron. 8 no.10:1793-1795 O '63. (MIRA 16:10)

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attenuator

[illegible]

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

S/0142/64/007/002/0253/0256

ACCESSION NR: AP4040755

AUTHOR: Valitov, R. A.; Domanova, Ye. A.; Tsarenko, V. T.

TITLE: Waveguide broadband power stabilizer

SOURCE: IVUZ. Radiotekhnika, v. 7, no. 2, 1964, 253-256

TOPIC TAGS: waveguide element, standing wave ratio, microwave equipment, power stabilizer

ABSTRACT: A stabilizer is described, capable of maintaining the load power constant within several per cent in a frequency range of 20%. The stabilizer is made broad-band by using an electrically controlled germanium-slab attenuator with a rectifying p-n junction. The input measuring element is a gas-discharge junction. Whenever the waveguide power deviates from the minimum level, an error signal modifies the admittance of the germanium slab and restores the power level. The accuracy of the apparatus is estimated at 3.5% when the

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ACCESSION NR: AP4040755

input power drops by 10 dB from not less than 2 mW initial level. The stabilizer can be used as an attachment to a sweep generator of the klystron type with mechanical automatic tuning provided the fm signal is additionally modulated in amplitude at approximately 1 kcs frequency. Orig. art. has: 4 figures and 5 formulas.

ASSOCIATION: None

SUBMITTED: 13Aug63

ENCL: 03

SUB CODE: EC

NR REF SOV: 004

OTHER: 000



APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

VALITOV, Rafkat Amirkhanovich, prof.; TARASOV, Vladislav Lukich; SHISHKIN, Leonid Adrianovich; TSARENKO, Viktor Timofeyevich; FILONENKO, Sergey Nikonovich; DOMANOVA, Yelena Alekseyevna; BARKANOV, Nikolay Arsent'yevich; SYTYY, Gennadiy Fedorovich; KURILOVA, T.M., red.; TROFIMENKO, A.S., tekhn. red.

[Measurement of transistor parameters] Izmereniia parametrov poluprovodnikovykh triodov. Khar'kov, Izd-vo Khar'kovskogo Gos. univ. im. A.M.Gor'kogo, 1960. 193 p. (MIRA 14:8)
(Transistors)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

POLULYAKH, Konstantin Stepanovich; LEYKIN, A.Ya., retsenzent; SKORIK, Ye.T., retsenzent; [illegible], retsenzent; TSARENKO, V.T., otv. red.; TRET'YAKOVA, A.N., red.; ALEKSANDROVA, G.P., tekhn. red.

[Electronic resonance measuring devices] Elektronnye rezonansnye izmeritel'nye pribory. Khar'kov, Izd-vo Khar'kovskogo gos. univ. im.A.M.Gor'kogo, 1961. 138 p. (MIRA 14:12)
(Electronic measurements) (Radio measurements)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

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discharge was [illegible] the load was [illegible]
resistive and the discharge [illegible] made [illegible]

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VALITOV, R.A.; TSARENKO, V.T.; [illegible], [illegible]

Experimental study of the frequency characteristi[illegible] [illegible]-frequency gas-discharge detectors. Izv. vys. ucheb. zav.; [illegible] 7 no.5:995-998 '64.

1. Khar'kovskiy gosudarstvennyy universitet.

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

DOROKHOV, Aleksandr Petrovich; KOROBKINA, Galina Stepanovna; STARODUBTSEV, Viktor Aleksandrovich; TSARENKO, Vladimir Timofeyevich; VOLKOV, A.A., retsenzent; OGORODNEYCHUK, I.F., retsenzent; RUDENKO, V.S., retsenzent; TETEL'BAUM, Ya.I., retsenzent; FILONENKO, S.N., dots., otv. red.; NESTERENKO, A.S., red.

[Principles of industrial electronics] Osnovy promyshlennoi elektroniki. [By] A.P.Dorokhov i dr. Khar'kov, Izd-vo Khar'kovskogo univ., 1964. 214 p. (MIRA 17:8)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

L 25830-66 EWT(1)/EEC(k)-2/T/EWA(h) IJP(c)

ACC NR: AP6015151 SOURCE CODE: UR/0142/66/009/002/0241/0243

AUTHOR: Tsarenko, V. T.; Malyshenko, L. Ye.

ORG: none

TITLE: The use of semiconductor diodes in uhf energy modulation in the 10-cm range

SOURCE: IVUZ. Radiotekhnika, v. 9, no. 2, 1966, 241-243

TOPIC TAGS: uhf, waveguide element, semiconductor diode

ABSTRACT: The results obtained with commercial-type D403 semiconductor diodes in modulating uhf energy in the 10-cm range are discussed. In the case of modulation with direct diode switching during the transmission period, negative characteristics are observed, i.e., low controlled attenuation (not exceeding 7 db per diode) with considerable losses (2—3 db) and a voltage standing wave ratio reaching 2. A modulator based on a twin T-junction waveguide, in which no resonant state of diodes is required, is also investigated. It was found that the modulation of the uhf energy is associated not with the reflection of energy but with its absorption. The modulator systems considered can be used as smooth electrically controlled atenuators in automatic control systems. Orig. art. has: 3 figures. [JR]

SUB CODE: 09/ SUBM DATE: 23Jan65/ ORIG REF: 004/ OTH REF: 002/

Card 1/1 UDC: 621.396.326

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

TSARENKO, Ya.A.

Labor on guard for peace. Mekh.sil'.hosp. 10 no.12:3-4 D '59. (MIRA 13:3)

1. Predsedatel' kolkhoza "Pershe travnya," Popilnyanskogo rayona, Zhitomirskoy oblasti.
(Popel'nya District--Collective farms)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

TSARENKO, Ye. G., Cand. Agri. Sci. (diss) "Local Variety of Winter Wheat of Western Oblasts of Ukraine as Initial Selection Material," Leningrad, 1961, 25 pp. (All-Union Acad. Agri. Sci. All-Un. Inst. Plant Raising) 150 copies (KL Supp 12-61, 280).

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

SHAVLOVSKIY, G.M.; TSARENKO, Ye.M.; FIKTASH, I.S.

Characteristics of flavine synthesis by the yeast Candida tropicalis var. rhagii. Dokl. AN SSSR 142 no.4:940-943 F '62. (MIRA 15:2)

1. L'vovskiy gosudarstvennyy universitet im. I. Franko. Predstavleno akademikom V.N.Shaposhnikovym.
(RIBOFLAVINE)
(CANDIDA TROPICALIS)

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SOV/76-33-8 20/39

5(4)

AUTHORS: Lantratov, M. F., Tsarenko, Ye. V.

TITLE: Investigation of the Thermodynamic Properties of Liquid Metallic Solutions. The System Potassium-Thallium

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 8, pp 1792-1797 (USSR)

ABSTRACT: The electromotive force (EMF) of the concentration cells K | glass | K-Tl for solutions with 12.6 to 95 atom% Tl was measured in the temperature range of 475-525°C. The design of the measuring cell (Fig 1) was the one described in references 2, 3, 11. The electrolyte was glass 35-5K (68% $SiO_2$, 29% $B_2O_3$, 3% $Al_2O_3$, 4% $Na_2O$ and 5% $K_2O$). The temperature was measured with a chromel/aluminum thermocouple via a potentiometer PP while the (EMF) was determined by means of a potentiometer PPTV-1. The thermodynamic properties of the liquid K-Tl solutions were calculated from the (EMF) values obtained for the concentration cells potassium | electrolyte with $K^+$-ions | potassium ($N_K$)-thallium ($N_{Tl}$) (Table 1) ($N_K$ and $N_{Tl}$ = atomic fraction of solution components). The

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

Investigation of the Thermodynamic Properties of Liquid Metallic Solutions SOV/76-33-3-20/33
The System Potassium-Thallium

properties calculated were activity, activity coefficient, partial molar free energies and excessive free energies for K and Tl at 525°C, as well as the integral values of the molar free energies $\Delta F$ of the excessive free energies $\Delta F^*$ of the mixture entropy $\Delta S$, of the excessive mixture entropy $\Delta S^*$, and the mixture heat $\Delta H$ (Table 2). The activity of K exhibits a complex dependence on the composition. Alloys with 0 - 25 At% Tl show a positive deviation from Raoult's law while solutions with less than 25 At% Tl deviate in the negative direction. These deviations are increased by lower temperatures. A similarly complicated matter are the isotherms of the activity coefficient of K. This behavior of liquid K-Tl solutions is considered to be due to a strong reaction taking place between K and Tl whereby structural groups of metallic compounds form in the solution. The integral curves of $\Delta F$, $\Delta F^*$, $\Delta S^*$ and $\Delta H$ exhibit extremes at $N_K = 0.4$ $\Delta H = 3560$ cal, $\Delta F = 2680$ cal, $\Delta F^* = 1510$ cal and $\Delta S^* = 2.44$ cal/degree. Since the values $\Delta H$ are for all compositions greater than the respective values for $\Delta F^*$, K-Tl solutions may not be regarded as "regular"

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ones (Ref 13). The shift of the extreme value away from the one which would correspond to the most stable K-Tl compound is explained by the fact that there are in the liquid alloys compounds richer in Tl side by side with the K-Tl compound. There are 4 figures, 2 tables, and 13 references, 5 of which are Soviet.

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut im. V. I. Ul'yanova (Lenina)
(Leningrad Electrotechnical Institute imeni V. I. Ul'yanov (Lenin))

SUBMITTED: January 31, 1958



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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

S/080/60/033/007/007/020
A003/A001

5 2610

AUTHORS: Lantratov, M. F., Tsarenko, Ye. V.

TITLE: An Investigation of Thermodynamic Properties of Liquid Metal Solutions in the Potassium-Mercury System

PERIODICAL: Zhurnal prikladnoy khimii, 1960, Vol. 33, No. 7, pp. 1539-1546

TEXT: The thermodynamic properties of liquid alloys of potassium with mercury were investigated within the temperature range of 250-350°C and within the concentrations $N_K$ = 0.04992 - 0.898 by the emf method. The thermodynamic properties were calculated from the emf values (E) and the temperature coefficients of emf($(\frac{dE}{dT})$) of the concentration circuits: K | solid electrolyte containing K + | K ($N_K$) - Hg ($N_{Hg}$), where $N_K$ and $N_{Hg}$ are the atomic percentage of potassium and mercury, respectively. Equations were presented for the calculation of the partial values of the isobaric-isothermal potential and the excess potential of potassium, for the partial molar entropy of mixing and the excess entropy of the mixture, for the partial molar heat of the mixture, etc. The emf was measured by a ППТВ-1 (PPTV-1) potentiometer. It was shown that the activity of potassium depends on the composition of the alloy. In solutions

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A003/A001

An Investigation of Thermodynamic Properties of Liquid Metal Solutions in the Potassium-Mercury System

containing from 0 to 35.5 atomic % mercury positive deviations from Raoult's law and in solutions containing more than 35.5 atomic % large negative deviations are observed. The most stable compound in the K-Hg system is $KHg_2$. The curve of the integral heat of mixing has a clear extremum at $N_K = 0.36$, i. e., in the region of the composition $KHg_2$. The maximum molar heat is -4.3 kcal/g-atom. There are 5 graphs, 2 tables and 20 references: 8 Soviet, 8 German, 3 English and 1 American.

SUBMITTED: January 28, 1960

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

LANTRATOV, M.F.; TSARENKO, Ye.V.

Thermodynamic properties of liquid metallic solutions of the systems Na - Ga and K - Ga. Zhur.prikl.khim. 34 no.11:2435-2441 N '61. (MIRA 15:1)

1. Leningradskiy elektrotekhnicheskiy institut imeni V.I.Ul'yanova (Lenina).

(Gallium alloys)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

LANTRATOV, M.F., TSARENKO, Ye.V.

Thermodynamic properties of the liquid metallic solutions of Zn - Bi and K - Cd systems. Zhur.prikl.khim. 33 no.5:1116-1128 My '60. (MIRA 13:7)

1. Leningradskiy elektrotekhnicheskiy institut im. V.I. Ul'yanova (Lenina).
(Zinc) (Bismuth) (Potassium) (Cadmium)

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

LANTRATOV, M.F.; TSARENKO, Ye.V.

Thermodynamic properties of liquid metallic solutions in the system potassium - mercury. Zhur.prikl.khim. 33 no.7: 1539-1546 Jl '60. (MIRA 13:7)
(Potassium-mercury alloys)

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

ABSTRACT: The increased efficiency of the locking-into-synchrotron regime, the

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

S/120/62/000/005/002/036
E032/E314

AUTHORS: Kazanskiy, G.S., Mikhaylov, A.I., Myznikov, K.P. and Tsarenkov, A.P.

TITLE: Methods of varying the time of interaction of the beam with the target in the 10 GeV proton synchrotron

PERIODICAL: Pribory i tekhnika eksperimenta, no. 5, 1962, 19 - 24

TEXT: Experiments designed for the proton synchrotron at the Joint Institute for Nuclear Studies require the availability of secondary-particle pulses of different lengths. Secondary particles are produced by bombarding an internal target and the time of interaction of the beam with the target determines the length of the secondary-particle pulse. The authors give in this paper a brief summary of the various methods used to alter the beam-target time of interaction. The methods for increasing the time of interaction are as follows: 1) resonance build-up of oscillations in which the resonance is excited artificially by modulating the accelerating voltage in such a way that the particles leave the phase-stability region. Particles leaving



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the acceleration process are deflected by the variable magnetic field onto the target and the time of interaction with the target is adjusted by adjusting the modulation amplitude. In this way, the length of the secondary-particle pulses can be increased to 250 ms. 2) Slow reduction in the amplitude of the accelerating voltage. This method is also based on the removal of the accelerated particles from synchronism by reducing the region of phase stability. The method has been discussed theoretically by V.I. Kotov and L.L. Sabsovich (PTE, 1957, no. 6, 19). However, an empirical approach was found to be more suitable.
3) Slow variation in the frequency of the accelerating voltage. A change in this frequency produces a change in the radius of the equilibrium orbit. This effect has been considered theoretically by M.S. Rabinovich (Tr. FIAN SSSR, 1958, 10, 23). The rate at which the beam is displaced onto the target is proportional to the rate of change in the frequency. Linear variation in the frequency was found to be inadequate and a special feedback system which controls the relation between the frequency and the magnetic field was developed, using the radial beam-position indicator reported by F.A. Vodop'yanov et al



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Methods of varying .... S/120/62/000/005/002/036
E032/E314

(Proceedings of the International Conference on High Energy Accelerators and Instrumentation, CERN, Geneva, 1959).
The methods used to reduce the beam-target interaction time were as follows: a) reduction in the radial dimensions of the beam during the acceleration process. In this method the width of the beam was reduced by slowly varying the frequency of the accelerating voltage; b) instantaneous change in the phase of the accelerating voltage. Here, the time of interaction was reduced by increasing the rate of displacement of instantaneous equilibrium orbits; c) rapid variation in the frequency of the accelerating voltage. This method has the considerable advantage that it gives rise to very little change in the output intensity (low particle losses). With a frequency variation of 1.8 Mc/s/s, the time of interaction can be reduced to 2 μs. This corresponds to the interception of 70% of the original beam by the target. There are 8 figures.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute for Nuclear Studies)

SUBMITTED: December 9, 1961



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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

KAZANSKIY, G.S.; MIKHAYLOV, A.I.; MYZNIKOV, K.P.; TSARENKOV, A.P.

[Methods for changing the duration of the interaction between the beam and the target in a synchrophasotron at 10 Bev] Metody izmeneniia dlitel'nosti vzaimodeistviia puchka s mishen'iu v sinkhrofazotrone na 10 Bev. Dubna, Ob"edinennyi in-t iadernykh issl., 1961. 17 p. (MIRA 15:1)
(Synchrotron) (Protons)

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S/089/63/014/002/003/019
B102/B186

246730

AUTHORS: Kazanskiy, G. S., Kuznetsov, A. B., Mikhaylov, A. I., Rubin, N. B., Tsarenkov, A. P.

TITLE: Investigation of the beam formation of accelerated particles in the proton-synchrotron by means of induction electrodes

PERIODICAL: Atomnaya energiya, v. 14, no. 2, 1963, 153 - 158

TEXT: The beam formation process in the first stage of acceleration at the proton-synchrotron of the Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research) in Dubna was studied with the help of electrostatic signal electrodes (Vodop'yanov, Kuzmin, et al., Proc. Intern. Conf. High-Energy Accelerators and Instrumentation, CERN, Geneva, 1959, p. 470, 477; Kazanskiy et al., Preprint OIYaI, B-50-819, Dubna, 1961). These electrodes are broad copper plates arranged to form two systems on either side of the beam. The plates of one system are arranged symmetrically to the mid-plane of the magnet (vertical electrodes), and those of the other perpendicular thereto (radial electrodes). The signal $V(\varphi)$ induced in the vertical electrodes is proportional to the change in the

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azimuthal charge density in the flying bunch: $V(\varphi) \simeq \frac{q(\varphi)}{C} \frac{l}{\pi} 2\pi$, where l is the electric length of the electrodes, C the capacitance of the plates relative to the earth, and π the perimeter of the equilibrium orbit. $V(\varphi)$ is led to an integrator which yields $V_{mean} = lQ/\pi C$, Q being the charge of the accelerated bunch. For the proton-synchrotron of the OIYaI the sensitivity of the vertical electrodes, $\alpha = C/el$, was $1 \cdot 10^{12}$ protons/v; $\pi = 208$ m, $l = 0.5$ m, $C = 400$ μμf. If the output voltage $V_{out}$ (cf. Fig. 1) is measured and the amplification factor K is known, the number of protons in the bunch, $N = V_{out}\, \alpha/K$, is determined. The signal $U(\varphi)$ of the radial electrodes records the horizontal deviation of the beam from the equilibrium radius; the radial sensitivity is 2v/cm. The electrode installation has a pass band of 0.1 - 3 Mc which allows a distortion-free recording of $V(\varphi)$ and $U(\varphi)$ and their amplitude modulation. A consideration of the motion of the particles along the phase trajectories taking account of the free oscillations shows that the amplitude structure of the beam must be observed during 100 - 150 μsec after the switching-on of the accelerating voltage; the beam formation takes place during the first 1 - 1.5 msec. The



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radial phase oscillations of the beam are accompanied by the oscillations of the azimuthal density with the frequencies $\Omega$ and $2\Omega$, where $\Omega$ is the angular frequency of the phase oscillations. The amplitudes of these oscillations depend on $\Delta M/b$, $\Delta M$ being the initial energy spread and b the radial separatrix half-dimension. If $\Delta M/b = 1$, the oscillation with the frequency $2\Omega$ vanishes; if $\Delta M/b \ll 1$, the damping of these oscillations takes place in 30 - 50 periods of the phase oscillations. The greater $\Delta M/b$, the more rapid is the damping. The same is true for the oscillations of the charge center. To the signal modulation with 40 - 50% depth observed at the synchrotron there corresponds a total initial energy spread of $\sim 1.5\%$. There are 10 figures.

SUBMITTED: April 4, 1962



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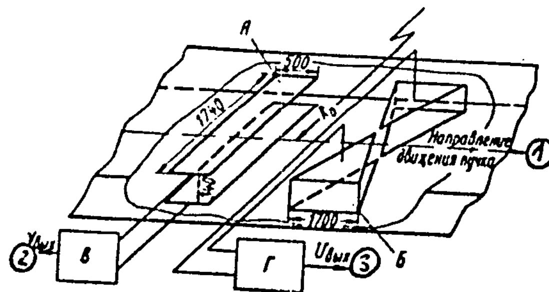
Investigation of the beam... S/089/63/014/002/003/019
B102/B186

Fig. 1. System of induction electrodes.

Legend: A - vertical electrodes, Б - radial electrodes, B - amplifier for the measuring system of the beam intensity, Г - transmitter of the radial beam position; (1) beamdirection, (2) $V_{out}$, (3) $U_{out}$.

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[illegible]/038/003/04[illegible]4/0415

AUTHOR: Kazansk[illegible]y, G. [illegible] [illegible]

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of the frequency of the accelerating potential and is consequently, ...

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KAZANSKIY, [illegible]; MIKHAYLOV, [illegible]; RUDIN, N.B.; TSARENKOV, A.P.

Phase grouping of a beam of charged particles when captured in the process of acceleration in an OIIAI proton-synchrotron. Atom. energ. 18 no.6:555-559 Je '65. (MIRA 18:7)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

KAZANSKIY, G.S.; TSARENKOV, A.P.

Control of a beam of accelerated particles during irradiation of thin targets in a synchrotron of the Nuclear Radiation Testing Plant. Zhur. tekh. fiz. 35 no.3:414-415 Mr '65.

(MIRA 18:6)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

KAZANSKIY, G.S.; MIKHAYLOV, A.I.; TSARENKOV, A.P.

Stabilizing the intensity of particle beams in an OIIAI proton-synchrotron. Zhur. tekh. fiz. 35 no.4:623-629 Ap '65. (MIRA 18:5)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

AUTHORS: Nasledov, D. N., Patrakova, A. Ya., Tsarenkov, B. V. 57-28-4-16/39

TITLE: Etching Media for Gallium Arsenide (Travitel' dlya arsenida galliya)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 4, pp. 779-781 (USSR)

ABSTRACT: The purpose of etching is here formulated in the following manner: A layer deformed during mechanical treatment shall be removed in a manner that the intact monocrystal appears and that the micropollution at the surface of the constructed device is also removed. The experiments showed that the etching reagent with the following composition is useful for this purpose: 50 mL 5% NaOH + 10 ml 30% $H_2O_2$. This chemical etching reagent is used by the authors in the production of electron-hole transitions in gallium-arsenide. Here polycrystalline samples as well as monocrystals of electron-gallium-arsenide were investigated. On the basis of these experiments the following is stated: 1.) Etching during 5 minutes entirely removes the deformed surface-layer of the monocrystal and does not produce any new formations at its surface. 2.) Etching

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lets distinctly appear the boundaries between the crystals in polycrystalline samples and the etch pattern of the individual crystals. 3.) Etching guarantees the production of reliable alloy-contacts and reduces the leakage current of the electron--hole transitions. The electronograms were obtained by V.A. Dorin. There are 3 figures and 2 references, 1 of which is Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut AN SSSR (Leningrad Physical-Technical Institute, AS USSR)

SUBMITTED: December 12, 1957



APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

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TSARENKOV, B.V.

24(4) PHASE I BOOK EXPLOITATION SOV/3140

Akademiya nauk Ukrainskoy SSR. Institut fiziki

Fotoelektricheskiye i opticheskiye yavleniya v poluprovodnikakh; trudy pervogo vsesoyuznogo soveshchaniya po fotoelektricheskim i opticheskim yavleniyam v poluprovodnikakh, g. Kiyev, 20-26 noyabrya 1957 g (Photoelectric and Optical Phenomena in Semiconductors; Transactions of the First Conference on Photoelectric and Optical Phenomena in Semiconductors...) Kiyev, 1959. 403 p. 4,000 copies printed.

Additional Sponsoring Agency: Akademiya nauk SSSR. Prezidium. Komissiya po poluprovodnikam.

Ed. of Publishing House: I. V. Kisina; Tech. Ed.: A. A. Matveychuk; Resp. Ed.: V. Ye. Lashkarev, Academician, Ukrainian SSR, Academy of Sciences.

PURPOSE: This book is intended for scientists in the field of semiconductor physics, solid state spectroscopy, and semiconductor devices. The collection will be useful to advanced students in universities and institutes of higher technical training specializing in the physics and technical application of semiconductors.

COVERAGE: The collection contains reports and information bulletins (the latter are indicated by asterisks) read at the First All-Union Conference on Optical and Photoelectric Phenomena in Semiconductors. A wide scope of problems in semiconductor physics and technology are considered: photoconductivity, photoelectromotive forces, optical properties, photoelectric cells and photoresistors, the actions of hard and corpuscular radiations, the properties of thin films and complex semiconductor systems, etc. The materials were prepared for publication by E. I. Rashboy, O. V. Snitko, K. B. Tolpygo, A. F. Lubchenko, and M. K. Sheynkman. References and discussion follow each article.

Photoelectric and Optical Phenomena (Cont.) SOV/3140

Kozhevin, V. Ye. Peculiarities of the Spectral Distribution of Condenser Photoelectric Effect in Semiconductors (Theses) 319

Andriyevskiy, A. I., and A. L. Rvachev. The Problem of the Formation Mechanism of Spectral Sensitivity Maxima of Rectifier Photoelectric Cells 323

Borzyak, P. G. A Phenomenon Accompanying the Photoelectromotive Force Effect in $Cs_3Sb$* 330

SEMICONDUCTOR PHOTOELECTRIC CELLS AND PHOTORESISTORS

Nasledov, D. N., and B. V. Tsarenkov. A Gallium Arsenide Photoelectric Cell 335

Tuchkevich, V. M., and V. Ye. Chelnokov. Silicon Photoelectric Cells 339

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SOV/181-1-9-26/31

AUTHORS: Nasledov, D. N., Tsarenkov, B. V.

TITLE: The Spectral Characteristics of GaAs Photoelements

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 9, pp 1467 - 1470

ABSTRACT: As the spectra of these photoelements had not been hitherto studied sufficiently nor systematically, the authors of the present paper investigated the dependence of the spectral characteristics of GaAs photoelements on the Cd- and Zn diffusion temperature in the formation of the p-n junction and on the etching. Polycrystalline n-GaAs plates (electron concentration: ~ $10^{17} cm^{-3}$, mobility ~2000 $cm^2/v.sec$) served as initial material. p-n junction was brought about by the diffusion of the acceptor impurities (Cd or Zn) from the gas phase into the pre-evacuated and melted ampul. The diffusion conditions are illustrated in a table. After diffusion, one side of the plate was ground and the depth of the p-region was controlled with a probe. The spectral characteristics were taken with illumination of the p-surface in perpendicular to the p-n junction plane and the darkened electrode.

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Measurements were made before etching and after 15-sec etching at room temperature with 5% NaOH + 30% $H_2O_2$ (5 : 1). The results are shown in two diagrams. The curves show the spectral distribution of the short-circuit current referred to one equal amount of incident photons. The wavelength limit $\lambda_{1/2}$ was determined at 0.91 $\mu$, and the width of the forbidden zone was calculated to be $\approx$ 1.35 ev. The following was established: the rise in the diffusion temperature of Cd in the range 760 - 960°C and of Zn in the range 520 - 620°C increases the steep slope of the spectral characteristic in the shortwave range and shifts the maximum into the longwave range; etching decreases the steep slope and shifts the maximum into the shortwave range. Some further details are discussed in this connection. It is finally mentioned that the graduate student S. P. Bardeyeva took part in the investigation. There are 2 figures, 1 table, and 9 references, 3 of which are Soviet.

ASSOCIATION: Leningradskiy Fiziko-tekhnicheskiy institut AN SSSR (Leningrad Institute of Physics and Technology of the AS USSR)

SUBMITTED: April 4, 1959



APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

S/058/62/000/004/057/160
A058/A101

AUTHORS: Nasledov, D. N., Tsarenkov, B. V.

TITLE: Gallium arsenide phototubes

PERIODICAL: Referativnyy zhurnal, Fizika, no. 4, 1962, 22, abstract 4G184 (V sb. "Fotoelektr. i optich. yavleniya v poluprovodnikakh". Kiev, AN USSR, 1959, 335-338)

TEXT: The authors give the preliminary results of working out a method for producing p-n junctions in gallium arsenide to prepare phototubes on their basis.

[Abstracter's note: Complete translation]

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82909
S/120/60/000/02/040/052
E192/E482

9,4160

AUTHOR: Tsarenkov, B.V.

TITLE: A Circuit for the Oscillographic Display of the Current-Voltage Characteristics of Photodiodes

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, Nr 2, pp 144-145 (USSR)

ABSTRACT: A detailed circuit diagram of the device is shown in Fig 1. A sinusoidal voltage having the frequency of 50 c/s is applied to the circuit from an autotransformer through a separator transformer TP. The voltage from the photodiode and the current from the resistance $R_o$ which is proportional to the current flowing through the photodiode are applied to the horizontal and vertical deflection plates of the oscillograph, respectively. An oscillogram of the voltage-current characteristic with two coordinate axes is obtained by means of a polarized relay which is operated at the frequency of 200 to 300 c/s by means of an audio generator. When the moving spring 1 (see Fig 1) is in contact with the fixed point 2, the horizontal deflection system is shorted and a portion of the vertical coordinate

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A Circuit for the Oscillographic Display of the Current-Voltage Characteristics of Photodiodes

is traced. During the transition of the spring 1 from one state to the other, a portion of the voltage-current characteristic is traced. When the spring 1 is in contact with the fixed point 3, the vertical deflection system is shorted and the horizontal axis is traced. The switching frequency of the relay is higher than the supply frequency for the circuit. It is therefore possible to obtain a continuous display of the characteristic. The resistance $R_1$ (see Fig 1) limits the current through the photodiode during its conduction in the forward direction. The current and voltage axes are calibrated by sinusoidal voltage by using a valve voltmeter V which is connected to the horizontal or the vertical deflection systems of the oscillograph by means of the key $K_4$. The results obtained with the circuit are illustrated in Fig 2. The author expresses his gratitude to D.N.Nasledov for his interest in this work and to N.S.Yakovchuk for

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

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E192/E482

A Circuit for the Oscillographic Display of the Current-Voltage Characteristics of Photodiodes

valuable advice. There are 2 figures, 1 table and 2 Soviet references.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Physics Engineering Institute, AS USSR)

SUBMITTED: January 24, 1959

Card 3/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

86431

S/181/60/002/011/015/042
B006/B056

9.4300 (3203, 1043, 1143)

AUTHORS: Nasledov, D. N., Smirnova, N. N., and Tsarenkov, B. V.

TITLE: The Temperature Dependence of the Main Parameters of GaAs Point-contact Diodes

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 11, pp. 2762-2769

TEXT: The authors produced point-contact diodes from n-type GaAs single crystals (conductivity at room temperature: 15 - 30 $ohm^{-1} \cdot cm^{-1}$; concentration: $n_n = 5 \cdot 10^{16} - 10^{17} cm^{-3}$; mobility: $\mu_n \simeq 2000\ cm^2/v \cdot sec$), and first give a brief description of the production method. The volt-ampere characteristics of the GaAs diodes were measured within the range of -196 - +300°C (Figs. 1, 2), and the main parameters are given in Table 2. The oscilloscopic characteristics were recorded by a "characteriograph" described in Ref. 6. The direct branches of the volt-ampere characteristics are described by the empirical formula

$I_{dir} = I_o \left\{ \exp\left[\frac{q(U_{dir} - I_{dir} r_s)}{\beta kT}\right] - 1 \right\}$. The factor $I_o \sim \exp(-\Delta E/kT)$ ($\Delta E \simeq 0.7$ ev); $\beta$ is a dimensionless factor which decreases with rising

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86431

The Temperature Dependence of the Main Parameters of GaAs Point-contact Diodes

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B006/B056

temperature (cf. Table 2); $r_s$ is the internal series resistance of the diode, and $U_{dir}$ is the direct voltage drop on the diode. The experimental results are shown in five diagrams. The direct current in the diode depends on recombination processes occurring in the volume-charge region, the base layer, and on the surface, and also on the ohmic resistance of the base layer. $I_{dir} = I_0 \exp(qU_c/\beta kT)$ and $I_{dir} \sim \exp\left[(\Delta E - qU_0/\beta)/kT\right]$, where $\Delta E$ is the activation energy. An analysis of the statistical volt-ampere characteristics in the temperature range concerned showed that: 1) the temperature dependence of the differential conductivity at $U_0$, of the factor $I_0$ in the empirical formula for the direct current and the reverse current at -1v is exponential in the range of 373-573$^o$K; the exponents coincide; 2) $\beta$ decreases with rising temperature and is greater than 2 at -196$^o$C; 3) the section voltage decreases with increasing temperature; the temperature coefficient coincides with the temperature coefficient of the contact potential difference calculated for a symmetrical p-n junction, whereas the absolute value of $U_{sec}$ is smaller than the calculated value of $U_{calc}$; 4) at a constant voltage, the direct current rises within the range of

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The Temperature Dependence of the Main Parameters of GaAs Point-contact Diodes

S/181/60/002/011/015/042
B006/B056

0 - 0.6 v with rising temperature. Within the range of 0.7 - 1 v it first increases, after which it drops, which is due to the temperature dependence of the internal series resistivity of the diode. There are 5 figures, 2 tables, and 9 references: 7 Soviet, 1 US, and 1 Australian.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR Leningrad (Institute of Physics and Technology of the AS USSR, Leningrad)

SUBMITTED: June 9, 1960

Таблица 2

| $T$, °C | $I_s$, а | $\beta$ | $r_s$, ом 1 | $U_{отс}$, в 2 | $I_{пр.}$ (+1 в), а 3 | $I_{обр.}$ (−1 в), а 4 |
|---|---|---|---|---|---|---|
| −196 | $2.5 \cdot 10^{-15}$ | 3.2 | 38 | 0.93 | 0.005 | — |
| 20 | $3.6 \cdot 10^{-10}$ | 1.7 | 20 | 0.67 | 0.0185 | $4.2 \cdot 10^{-8}$ |
| 300 | $4 \cdot 10^{-5}$ | 1.55 | 29 | 0.34 | 0.0275 | $1.8 \cdot 10^{-4}$ |

Legend to Table 2: 1) $r_s$ expressed in ohms; 2) $U_{sec}$ in v, $I_{dir}$ at +1v in a; 4) $I_{rev}$ at -1v in a.



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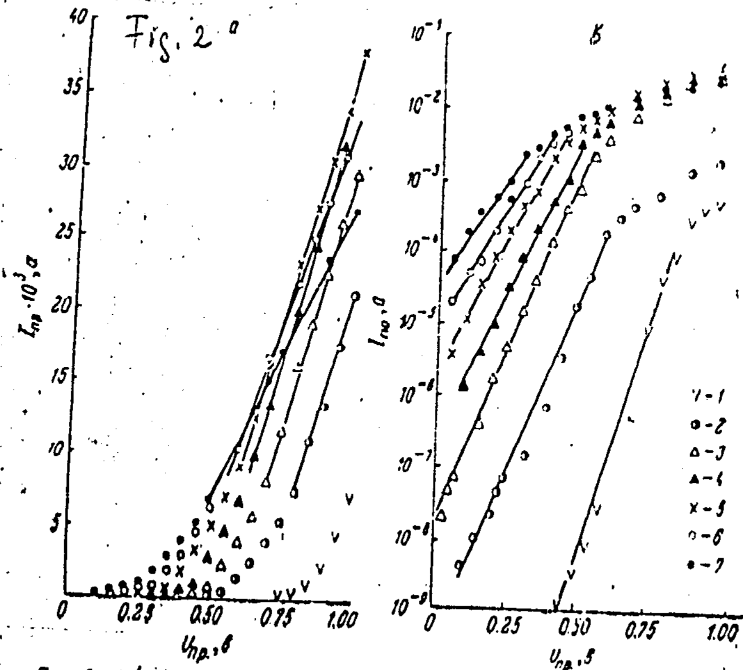

Legend to Fig. 2: Direct branches of the volt-ampere characteristics of the GaAs point-contact diode No. 2 at different temperatures, on a linear (a) and a semilogarithmic (b) scale. 1) 77°K; 2) 293°K; 3) 373°K; 4) 423°K; 5) 473°K; 6) 523°K; and 7) 573°K.

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

20802

9.4300 (1043,1143,1150)

S/181/61/003/003/029/030
B102/B205

26.2532

AUTHORS: Burdukov, Yu. M., Imenkov, A. N., Nasledov, D. N., and Tsarenkov, B. V.

TITLE: Alloyed GaAs junction diodes

PERIODICAL: Fizika tverdogo tela, v. 3, no. 3, 1961, 991-994

TEXT: This is the continuation of Refs. 1-9 which the authors published in FTT with the exception of Ref. 9 (C. T. Sah, R. N. Noyce, W. Shockley, Proc. IRE, 45, 9, 1228, 1957). The diodes studied were made from thin plates of n-type GaAs single crystals which had been grown by the method of Chokhral'skiy. Their resistivity was 0.02 ohm·cm, their electron concentration $\lesssim 10^{17}$ cm$^{-3}$, and their mobility 3500 cm$^2$/v·sec at room temperature. The p-n junction was obtained by introduction of molten zinc or from the eutectic Au-Zn alloy. Lead served as non-rectifying base contact. The area of the p-n junction was equal to S = 0.005 cm$^2$. The volt-ampere characteristics of such a diode at 25 and 300°C are shown in a figure. They were recorded by the "characteriograph" described in Ref. 10 (Tsarenkov, PTE, No. 2, 144,

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S/181/61/003/003/029/030
B102/B205

Alloyed GaAs ...

1960). The most important results were the following: 1) The direct branch of the diode characteristic at voltages below the cutoff voltage can be described by the formula $I_{dir} = I_o[\exp(qU_{dir}/\beta kT) - 1]$ (1). $I_{dir}$ is the direct current density, $U_{dir}$ the direct voltage drop on the diode, and $\beta$ a dimensionless factor. $I_o$ increases with rising temperature. Within the range of nitrogen temperatures to room temperature, $I_o(T)$ is a weak function (weaker than at higher temperatures). At room temperature, $I_o \simeq 10^{-8}-10^{-7}$ a/cm$^2$, and at 300°C, $I_o \simeq 10^{-5}-10^{-4}$ a/cm$^2$. $\beta$ decreases with rising temperature within the range of -196-+300°C. At nitrogen temperatures, $\beta \simeq 7 - 12$; at room temperature, 2 - 3; and on a further change in temperature, it approaches a value $\lesssim 2$. The direct branches of the volt-ampere characteristics of several diodes have two exponential sections: $I'_{dir} = I_{o1}\exp(qU'_{dir}/\beta_1 kT)$ and $I''_{dir} = I_{o2}\exp(qU''_{dir}/\beta_2 kT)$; $U'_{dir} < U''_{dir}$, $I_{o1} \gg I_{o2}$, $\beta_1 > \beta_2$. $I_{o1}$ and $I_{o2}$ increase with temperature ($I_{o2}$ faster than $I_{o1}$); at 200-300°C, $I_{o1} \simeq I_{o2}$, $\beta_1 \simeq \beta_2$. The occurrence of two

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B102/B205

Alloyed GaAs ...

exponential sections of the direct branch is related to the surface properties of the diode. By a change of the composition of the etching agen., one of them disappears, and in formula (1) $I_o \simeq I_{o2}$ and $\beta \simeq \beta_2$. The existence of two sections and the disappearance of one section by surface treatment is ascribed to the fact that the surface of gallium arsenide has an inverse layer. The cutoff voltage of the direct branch is lower than the contact voltage calculated according to Shockley's junction theory, and drops with increasing temperature. The temperature coefficients of the two voltages are almost equal. The curvature $G_s$ of the linear section of the direct branch calculated from the data of the diode with a base 0.5 mm thick amounted to $\sim 10^3$ a/v·cm$^2$. The differential resistance at zero voltage can be exactly calculated from the formula $R_o = \beta kT/qI_o$. $R_o(T)$ is nearly inverse to $I_o(T)$. $R_o$ of diodes with two exponential sections of the direct branch is much smaller than $R_o$ of diodes with only one section. The reverse branch of the characteristics at voltages lower than the breakdown voltage can be described by the empirical formula $I_{rev} = AU^n_{rev}$, where $n \leqslant 1$; $I_{rev}$ increases with temperature. The breakdown voltage also increases with temperature, which is



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Alloyed GaAs ...

taken as an indication of the electric character of breakdown in low-voltage GaAs diodes. There are 1 figure and 11 references: 9 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Leningrad (Institute of Physics and Technology, AS USSR, Leningrad)

SUBMITTED: September 23, 1960

Legend to Fig.: Ordinate unit 4 ma, abscissa unit 1 v (left-hand diagrams) or 0.25 v (right-hand diagrams).

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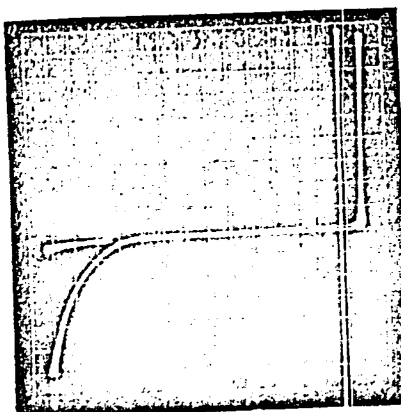
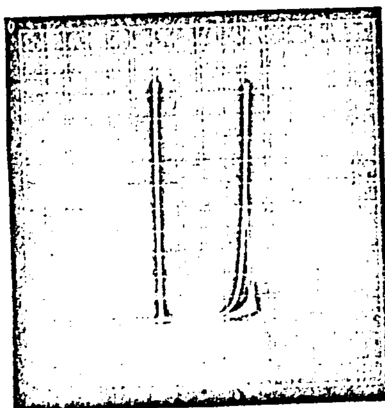
Alloyed GaAs ...

25°C





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Alloyed GaAs...

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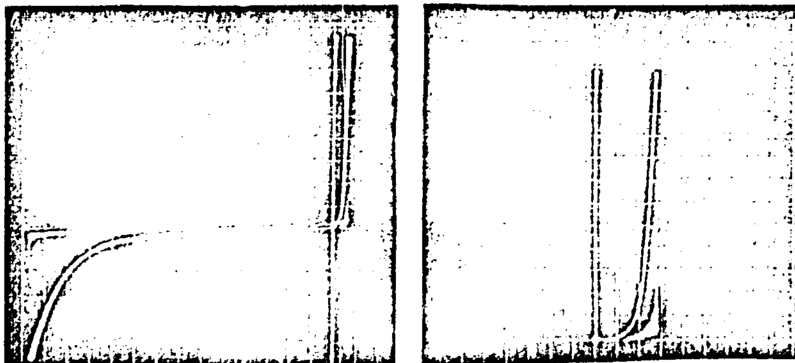
B102/B205

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S/181/62/004/004/038/042
B102/B104

AUTHORS: Nasledov, D. N., Rogachev, A. A., Ryvkin, S. M., and Tsarenkov, B. V.

TITLE: Recombination radiation of gallium arsenide

PERIODICAL: Fizika tverdogo tela, v. 4, no. 4, 1962, 1062-1065

TEXT: Monocrystalline n-type InAs plates with an electron concentration of $\leqslant 10^{17} cm^{-3}$ were used to study the intrinsic recombination radiation. A p-n junction of $\approx 0.1 cm^2$ was produced by diffusion of Zn or Cd into the InAs plate. The nonequilibrium carriers were excited by pulsed injection through the junction. The radiation was observed in parallel to the p-n junction plane. At 77°K the emission spectrum has a narrow peak at 1.47 ev (optical self-absorption edge) and two maxima at lower energies which are in connection with recombination via impurity levels. One of these levels is 0.2 ev distant from the middle of the forbidden band, the other 0.25 ev from a band edge. The relative height of all maxima depends on the current density through the p-n junction. At less
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than 1a/cm$^2$ only impurity radiation is observed, then intrinsic radiation arises and increases rapidly, and between 10 and 100 a/cm$^2$ the relative height of the maxima remains constant. The results can be explained by assuming volume-charge recombination at weak currents and injection at high currents. At above 10 a/cm$^2$ the emission intensity increases linearly with the current density through the p-n junction and decreases only above $\sim 10^3$ a/cm$^2$. The forbidden band width is temperature-dependent according to the law $(1.51-5.6\cdot 10^{-4}T)$ ev. The intrinsic emission line narrowing observed at high current densities can be explained by inverse band filling (production of states with "negative temperature") or by assuming that the injected carriers cause degenerate filling of one band only. The latter possibility is more probable. There are 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR, Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: January 11, 1962



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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

GUTKIN, A.A.; NASLEDOV, D.N.; SEDOV, V.Ye.; TSARENKOV, B.V.

Photoelectric properties of GaAs p-n junctions. Fiz. tver. tela 4 no.9:2338-2348 S '62. (MIRA 15:9)

1. Fiziko-tekhnicheskiy institut imeni A.F. Ioffe AN SSSR, Leningrad.
(Junction transistors) (Gallium arsenide)
(Photoelectricity)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

NASLEDOV, D.N.; ROGACHEV, A.A.; RYVKIN, S.M.; KHARTSIYEV, V.Ye.;
TSARENKOV, B.V.

Structure of direct recombination spectra of gallium arsenide. Fiz. tver. tela 4 no.11:3346-3348 N '62.
(MIRA 15:12)

1. Fiziko-tekhnicheskiy institut imeni A.F. Ioffe AN SSSR, Leningrad.
(Gallium arsenide—Spectra)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

GUTKIN, A.A.; NASLEDOV, D.N.; SEDOV, V.Ye.; TSARENKOV, B.V.

Photoelectric solar energy converters using GaAs.
Radiotekh. i elektron. 7 no.12:2095-2096 D '62.
(MIRA 15:11)

1. Fiziko-tekhnicheskiy institut im. A.F. Ioffe AN SSSR.
(Photoelectric cells)
(Solar batteries)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

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L 14978-63 EWA(1)/EWG(k)/EWP(q)/EWT(m)/BDS AFFTC/ASD/ESD-3/SSD
Px-4/Pz-4 AT/JD/WG/IJP(C)
ACCESSION NR: AP3004916 S/0120/63/000/004/0187/0188

AUTHOR: Gutkin, A. A.; Rogachev, A. A.; Sedov, V. Ye.; Tsarenkov, B. V.

TITLE: Low-inertia gallium arsenide light-generating diode

SOURCE: Pribory i tekhnika eksperimenta, no. 4, 1963, 187-188

TOPIC TAGS: gallium arsenide light generator, light-generating diode, gallium arsenide diode, carrier injection luminescence, injection luminescence, gallium arsenide laser, laser, carrier, luminescence, injection

ABSTRACT: A light-generating diode made of single crystal n-type gallium arsenide diffused with p-type zinc has been constructed and tested. Light emission was produced at room temperature by applying a pulsed current with pulse duration of 1—10 μsec across the p-n junction. The obtained light spectrum showed two maxima centered at 0.95 and 1.3 μ. The time constant was less than $5 \times 10^{-8}$ sec. At a maximum injection current of 20 amp the efficiency of the generator was about 0.1%. The authors hope to increase the photon flux several times by constructional refinements and the use of higher quality material. The author acknowledges that while the present article was being prepared for printing, the journal

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ACCESSION NR: AP3004916

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Electronics (July 1962, 13, 7; 1962, 27, 24) disclosed the construction (in the U. S.) of a gallium arsenide light-generating diode with a power of 3 w operated at liquid-nitrogen temperatures. "The authors thank D. N. Nasledov and S. M. Ry*vkin for their interest in the work." Orig. art. has: 4 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Physicotechnical Institute, AN SSSR)

SUBMITTED: 14Sep62 DATE ACQ: 28Aug63 ENCL: 00

SUB CODE: PH NO REF SOV: 001 OTHER: 001

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

TSARENKOV, B.V.

AID Nr. 975-13 23 May

ELECTRICAL BREAKDOWN OF GaAs p-n JUNCTIONS (USSR)

Nasledov, D. N., and B. V. Tsarenkov. Fizika tverdogo tela, v. 5, no. 4, Apr 1963, 1181-1188. S/181/63/005/004/036/047

A stud[illegible] of electrical discharge in GaAs junction diodes has been made with monocrystalline specimens of n-type gallium arsenide with $5 \cdot 10^{16}$ to $10^{17}$ $cm^{-3}$ electron concentration and 3000 to 3500 $cm^2/v \cdot sec$ electron mobility. The specimens were doped with Cd or Zn impurities. The thickness of the p-layer was 10-20 μ after Cd diffusion and 20-100 μ after Zn diffusion. The breakdown voltage was under 10 v at room temperature. Results show that the breakdown voltage and the critical field increase almost linearly with the temperature in the range from 77 to 540°K. With constant temperature the breakdown voltage increases with increasing critical width of the volume charge layer during breakdown, while the critical field decreases. It is shown that the breakdown mechanism is impact ionization. [BB]

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

S/0181/64/006/003/0776/0779

ACCESSION NR: AP4019837

AUTHORS: Ivanova, Ye. A.; Nasledov, D. N.; Tsarenkov, B. V.

TITLE: Lifetime of current carriers in space charge layer of GaAs-p-n-transitions

SOURCE: Fizika tverdogo tela, v. 6, no. 3, 1964, 776-779

TOPIC TAGS: space charge, p n transition, volt-ampere characteristic, vacuum diode, current density

ABSTRACT: The lifetime of current carriers in a space charge layer of GaAs-p-n-transition has been determined from the straight portion of the statistical volt-ampere characteristics, under conditions when the experimental volt-ampere characteristics of a diode could be compared quantitatively with theory. The Sah-Noyce-Shockley (Proc. IRE, 45, 1228, 1957) equation for the volt-ampere characteristics is used to predict the lifetime $\tau_0$, i.e.,

$$I_{Star} = I_{p}e^{\frac{qU}{2kT}} = qn_i\frac{kT}{qE_m}\frac{1}{\tau_0}e^{\frac{qU}{2kT}},$$

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

ACCESSION NR: AP4019837

and is compared to the data from two vacuum diodes (Nos. 58 and 64). The results show that $\tau_0$ does not depend on the nonequilibrium carriers up to current densities of 1 amp/cm$^2$, nor on temperature in the interval 293 to 545K. Its value was estimated to lie between $10^{-9}$ and $10^{-8}$ sec. "The authors express their gratitude to R. F. Kazarinov and V. I. Stafeyev for their help." Orig. art. has: 4 formulas, 1 table, and 1 figure.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Physical and Technical Institute AN SSSR)

SUBMITTED: 05Sep63 DATE ACQ: 31Mar64 ENCL: 00

SUB CODE: PH NO REF SOV: 003 OTHER: 004



APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

GUTKIN, A.A.; ROGACHEV, A.A.; SEDOV, V.Ye.; TSARENKOV, B.V.

Low-inertia light source from gallium arsenide. Prib. i tekh. ekep. 8 no.4:187-188 Jl-Ag '63. (MIRA 16:12)

1. Fiziko-tekhnicheskiy institut AN SSSR.

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

TITLE: Electrical properties of pn tunnel junctions in gallium arsenide

Card 1/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

ACCESSION NR: AP[illegible]

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The values of $\varepsilon$ [illegible] temperature which [illegible]

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ASSOCIATION: Fiziko-tekhn... Ioffe AN SSSR

SUB CODE: ...

Card 3/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

L 31082-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD

ACCESSION NR: AP5006880 S/0181/65/007/003/0775/0780

AUTHOR: Imenkov, A. N.; Kozlov, M. M.; Meskin, S. S.; Nasledov, D. N.; Ravich, V. N.; Tsarenkov, B. V.

TITLE: Electroluminescence spectra of strongly degenerate gallium arsenide

SOURCE: Fizika tverdogo tela, v. 7, no. 3, 1965, 775-780

TOPIC TAGS: gallium arsenide, semiconductor, electroluminescence, p n junction, recombination radiation, radiative recombination

ABSTRACT: An investigation was made of the injection electroluminescence of GaAs tunnel p-n junctions at temperatures of 77 and 293K. In preparing the diodes, zinc was diffused into an n-type GaAs monocrystal up to hole concentrations of $\sim 5 \cdot 10^{19}$ cm$^{-3}$ in a 10—20 micron surface layer. The tunnel p-n junction was fabricated by diffusing tin into the p-side of GaAs. The emission was found to vary strongly with injection current. Recombination radiation spectra showed a peak which with increasing current densities was shifted toward higher photon energies (from 1.0 to 1.445 ev at 77K). Other maxima independent of the injection current were also present. A very distinct peak at 1.42 ev was observed at 77K. Analysis of the experimental data showed that at small injection current densities (less

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ACCESSION NR: AP5006880

than 1—2·10$^4$ amp/cm$^2$ electroluminescence depends on the properties of tunnel diodes, while at higher current densities it is determined by the properties of the p-region. The current-independent peaks were attributed to tunneling of electrons into deep-lying levels in the forbidden band and subsequent radiative recombination. Orig. art. has: 6 figures. [CS]

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR, Leningrad (Physicotechnical Institute, AN SSSR)

SUBMITTED: 15Aug64 ENCL: 00 SUB CODE: SS, OP

NO REF SOV: 005 OTHER: 006 ATD PRESS: 3198

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APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

ACCESSION NR: AP5007092 S/0109/65/010/003/0468/0475

AUTHOR: Burdukov, Yu. M.

SOURCE: Radiotekhnika i elektronika, v. 10, no. 3, 1965, 468-475

TOPIC TAGS: pn junction, gallium arsenide semiconductor

ABSTRACT: Alloy and diffusion junctions and diodes were prepared from GaAs single crystals having

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ACCESSION NR: AP5007[illegible]

capacitance of an alloy [illegible]

ASSOCIATION: Fiziko-tekhnicheskiy [illegible] Ioffe AN SSSR [illegible]

SUBMITTED: [illegible]

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L 33954-65 EWT(1)/EWT(m)/T/...(t)/...(h)

ACCESSION NR: AP5005313

S/0181/65/007/002/0634/0636

AUTHOR: Imenkov, A. N.; Kozlov, M. M.; ...in, S. S.; Nasledov, D. N.; Ravich, V. N.; Tsarenkov, B. V.

TITLE: Recombination radiation in GaAs tunnel p-n junctions

SOURCE: Fizika tverdogo tela, v. 7, no. 2, 1965, 634-636

TOPIC TAGS: tunnel effect, tunnel p n junction, p n junction, recombination radiation, recombination, gallium arsenide

ABSTRACT: The dependence of the integral intensity of radiation Φ on the current I in the range of current densities 50—$10^4$ amp/cm² can be represented in the form of the sum of two members $\Phi = \Phi_2 + \Phi_3 = A(T)I^n + \Phi_3(T,I)$, where the member $\Phi_3(T,I)$ is the part of the radiation intensity which is added to the intensity $\Phi_2$. The fact that at a certain voltage the volt-ampere characteristic and the curve of the dependence of the radiation intensity on voltage display a "hump" indicates that the excess currents connected with tunnel transitions contribute to the radiation. Contrary to the findings of other researchers (e.g., Anderson, R., Proc. IEEE, 51, 1963, 610), no radiation in the region of



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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

L 33954-65
ACCESSION NR: AP5005313

negative conductivity of the tunnel diode was detected. Orig. art. has: 2 figures and 2 formulas. [ZL]

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe, AN SSSR, Leningrad (Physical-Technical Institute, AN SSSR)

SUBMITTED: 31Jul64 ENCLOSURE: 00 SUB CODE: SS, NP

NO REF SOV: 001 OTHER: 004 ATD PRESS: 3209



APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

IMENKOV, A.N.; KOZLOV, M M.; NASLEDOV, D.N.; TSARENKOV, B.V.

Electron-hole transition in heavily degenerate semiconductors in the case of superhigh current densities. Fiz. tver. tela 7 no.5: 1480-1485 My '65. (MIRA 18:5)

1. Fiziko-tekhnicheskiy institut imeni Ioffe AN SSSR, Leningrad.

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

L 3928-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(h) IJP(c) JD/AT

ACC NR: AP5025399 SOURCE CODE: UR/0181/65/007/010/3115/3118

AUTHOR: Imenkov, A. N.; Kogan, L. M.; Kozlov, M. M.; Meskin, S. S.; Nasledov, D. N.; Tsarenkov, B. V.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: The effect of impurities on the recombination radiation of gallium arsenide

SOURCE: Fizika tverdogo tela, v. 7, no. 10, 1965, 3115-3118

TOPIC TAGS: recombination radiation, gallium arsenide, pn junction, impurity, acceptor, donor

ABSTRACT: The effect of Zn, Cd, Mn, and Fe impurities on the recombination radiation of GaAs p-n junctions was experimentally investigated. The junctions were formed by direct diffusion of the element, by simultaneous diffusion of Mn and Cd and Fe and Cd, or by diffusion of Mn and then Cd, or Fe and then Cd into n-type GaAs with an electron concentration ($N_n$) of $5 \times 10^{16}$—$3 \times 10^{18}$ $cm^{-3}$ (crystals with $N_n > 7 \times 10^{17}$ $cm^{-3}$ were doped with Te). The junction area was $10^{-3}$—$10^{-4}$ $cm^2$. The recombination spectra were measured at 77 and 293K in the photon energy range between 0.7 and 1.6 ev. The spectra were recorded at direct injection currents at which the energy of the short wavelength band was independent of the current. The experimental data are given in Fig. 1 and Table 1. The band with $h\nu_{max} \approx 1.01$ ev (77K) and $h\nu_{max} = 0.95$—$0.98$ ev

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ACC NR: AP5025399

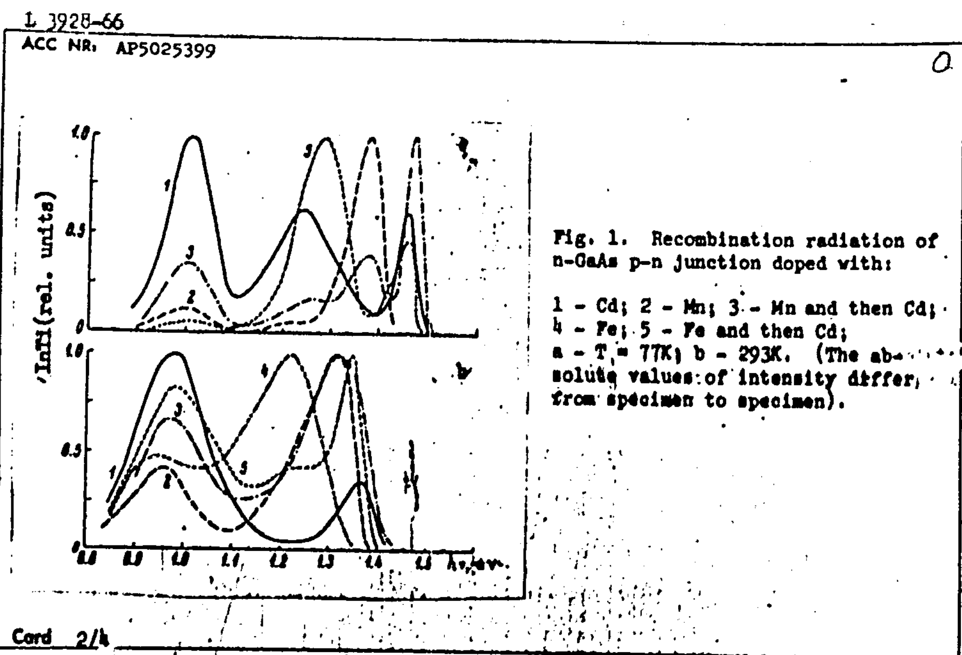

Fig. 1. Recombination radiation of n-GaAs p-n junction doped with:

1 - Cd; 2 - Mn; 3 - Mn and then Cd; 4 - Fe; 5 - Fe and then Cd; a - T = 77K; b - 293K. (The absolute values of intensity differ from specimen to specimen).

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L 3928-66

ACC NR: AP5025399

Table 1. Photon energy in the band peaks ($h\nu_{max}$) and band halfwidths

| Impurity | T, °K | Emission Band | | | |
|---|---|---|---|---|---|
| Zn $8\cdot10^{16} < n_e < 7\cdot10^{17}$ $cm^{-3}$ | 77 | 1.48—1.47 (0.015—0.022) | — | 1.27 (0.12) | 1.02 (0.17) |
| | 293 | 1.38÷1.36 (0.035÷0.050) | — | — | 0.97 (0.14) |
| Zn $8\cdot10^{16} > n_e > 10^{16}$ $cm^{-3}$ | 77 | 1.47—1.46 (0.022—0.030) | — | 1.30—1.3[illegible] | 1.02 (0.12) |
| | 293 | 1.38—1.36 (0.035—0.050) | — | — | 0.97 (0.14) |
| Cd | 77 | 1.48—1.46 (0.025—0.045) | — | 1.25 (0.13) | 1.01 (0.12) |
| | 293 | 1.38—1.36 (0.040—0.080) | — | — | 0.97 (0.14) |
| Mn | 77 | — | 1.39—1.38 (< 0.10) | — | 1.02 (0.12) |
| | 293 | — | 1.33—1.32 (0.13) | — | 0.96 (0.15) |
| Mn + Cd | 77 | ≈ 1.47 (0.005) | 1.385 (< 0.10) | 1.26 | 1.01 (0.12) |
| | 293 | 1.37—1.32 (0.14—0.0[illegible]) | — | — | 0.98 (0.15) |
| Fe | 77 | — | 1.28 | — | 1.01 |
| | 293 | — | 1.22 (0.10) | — | 0.97—0.95 |
| Fe + Cd | 77 | ~ 1.46 (0.045) | 1.30 (0.12) | — | 1.08 |
| | 293 | 1.38 | 1.31 | — | 0.97 (0.14) |



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(293K) and the band with $h\nu_{max} \approx 1.25$ ev, clearly defined only at 77K in junctions doped with Zn and Cd and less sharply defined in those doped with Mn and Fe, were attributed to recombination radiation of excess carriers via the deep levels with activation energies of 0.5 and 0.25 ev, respectively. Orig. art. has: 2 figures and 1 table. [CS]

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L 6509-66 EWT(l)/EWT(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/GG

ACCESSION NR: AP5019425 UR/0020/65/163/003/0606/0608

AUTHOR: Belle, M. L.; Valov, Yu. A.; Goryunova, A. N.; Zlatkin, L. B.; Imenkov, A. N.; Kozlov, M. M.; Tsarenkov, B. V.

TITLE: Optical and photoelectric properties of single-crystal $ZnSiP_2$

SOURCE: AN SSSR. Doklady, v. 163, no. 3, 1965, 606-608

TOPIC TAGS: optical property, photoelectric property, zinc compound optic material, forbidden band, light polarization, absorption edge, temperature dependence

ABSTRACT: In view of the lack of published data on this compound, the authors have studied the photoelectric and optical properties of n-type single crystals obtained from the gas phase by the method of gas-transport reactions. The spectral sensitivity of the photoconductivity was measured at 77 and 300K using a setup comprising a tungsten incandescent lamp, a light interrupter, a monochromator (IKS-21), amplifier (V2-6), synchronous detector, and electronic potentiometer (EPP-09). The absorption spectrum was measured with the spectrograph and a camera at 300, 77, and 4.2K. In addition, the authors investigated the influence of polarization of the incident light on both the optical and photoelectrical properties. Photoconductivity was observed at incident photon energies 0.5--2.5 ev. At 300K the photoconductivity has a highly peaked maximum at 2.14 ev, and also maxima at 0.8 and 1.0

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ACCESSION NR: AP5019425

ev, attributed to impurities. At 77K the maxima shift to 2.19, 1.04, and 0.84 respectively. The spectral photoconductivity curve exhibited also some kinks due to transitions of the electrons from the valence to the conduction band. Polarization began to affect the photoconductivity only above 2 ev, when the photoconductivity became highly sensitive to the direction of the electric vector. This may be due to anisotropy of the crystal. Not all crystals showed a sharp absorption edge, a fact attributed to the number of crystal defects. Where a sharp absorption edge was observed, it showed a dependence on the temperature and on the polarization. The maxima of the photoconductivity and the start of the strong optical absorption were very close to each other, and the sharpness of the absorption edge suggests the presence of direct interband transitions in $ZnSiP_2$. The forbidden band is estimated at 2.13 ev at 300K and between 2.2 and 2.25 ev at 77K. Two absorption bands are observed at 2.23 and 2.27 ev at 77 and 4.2K, and their origin is not clear. This report was presented by L. A. Artsimovich. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute, Academy of Sciences SSSR) 44,55

SUBMITTED: 17Nov64 ENCL: 00 SUB CODE: OP, SS

NR REF SOV: 002 OTHER: 001

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920003-8

ACC NR: AP6004486 UR/0048/66/030/001/0135/0137

AUTHOR: Vorob'yev, A.A.; Dotsenko, Yu.V.; Seliverstov, D.M.; Tsarenkov, B.V.

ORG: none

TITLE: Use of semiconductor light sources to investigate the time resolution of photomultipliers /Transactions of the Fifteenth Annual Conference on Nuclear Spectroscopy and Nuclear Structure held at Minsk 25 January to 2 February, 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 1, 1966, 135-137

TOPIC TAGS: photomultiplier, time measurement, semiconductor diode, flash lamp

ABSTRACT: The resolving times of three photomultipliers (types K14FS-50, FEU-36 and FEU-30) were measured using a gallium phosphide diode as light source. Part of the purpose of the present paper is to point out the usefulness and convenience of semiconductor light sources for such measurements and for other measurements in nuclear physics. Gallium arsenide diodes produce short flashes with very little scatter in the delay between pulse arrival and flash, but the wavelength of the light is outside the sensitive range of present photomultipliers. The gallium phosphide diode used in the present work was excited by a 10-20 nanosec 70 V pulse from a pulse generator and produced a 100 nanosec flash in the green with an amplitude equal to that excited in a stilbene scintillator by a $Co^{60}$ gamma ray. The pulse produced as a result of this flash in the 5 kilohm load resistor of the photomultiplier under test was shaped to



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ACC NR: AP6004486

30 nanosec and 2.0 V and brought, together with the attenuated and delayed pulse from the pulse generator, to a time to pulse height converter with a resolution of 0.15 nanosec. The output pulses from the converter were recorded in a 100-channel pulse height analyzer. There was thus obtained a curve representing the scatter of the delay times between the initiating pulse and the pulse from the photomultiplier. The half-width of this curve, which represents the resolving time of the photomultiplier increased by the scatter introduced by the light source, was plotted for each photomultiplier tube against the potential applied to the dynodes. In each case the resolving time was minimum for a certain optimum dynode potential. The minimum resolving time of 0.14 nanosec obtained for the K14FS-50 photomultiplier is in good agreement with the value 0.134 nanosec found by M.Bonitz, W.Meiling, and F.Stary (Nucl. Instr. and Meth., 29, 309 (1964)) using a hydrogen lamp. It is concluded that the scatter of the delay between pulse and flash in the gallium phosphide diode is not greater than in the hydrogen discharge tube. The effect of varying the intensity of the flash on the resolving time of the K14FS-50 photomultiplier was also investigated. The resolving time increased rapidly when the flash intensity was reduced below that of a $Co^{60}$ gamma-ray scintillation in stilbene, and decreased only slowly when the flash intensity was increased above that value. Orig. art. has: 3 figures.

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L 37687-66 EEC(k)-2/EWP(k)/EWT(1)/EWT(m)/FBD/T/EWP(t)/ETI IJP(c) WG/JD

ACC NR: AP6024502 SOURCE CODE: UR/0181/66/008/007/2251/2253

AUTHOR: Gol'dberg, Yu. A.; Nasledov, D. N.; Tsarenkov, B. V.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fizikotekhnicheskiy institut AN SSSR)

TITLE: Dependence of electroluminescent parameters of GaAs lasers on the angle between the p-n junction plane and the resonator mirrors

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2251-2253

TOPIC TAGS: semiconductor laser, gallium arsenide laser, diode laser, laser output, gallium arsenide, laser, pn junction

ABSTRACT: The threshold current density and the output of diode lasers were investigated experimentally as a function of the angle ($\phi = 90° \pm \theta$) between the p-n junction plane (100) and the resonator mirrors placed in the (110) plane. It was shown that: 1) the threshold current density decreased with an increase in the distance between mirrors l (Fig. 1), and with a decrease in the angle when l = const (Fig. 2); and 2) quantum yield increased with a decrease in θ (Fig. 2). The maximum angle $\theta_{max} = \frac{d}{l}$ (where d = width of active medium) for which the rereflected

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ACC NR: AP6024502

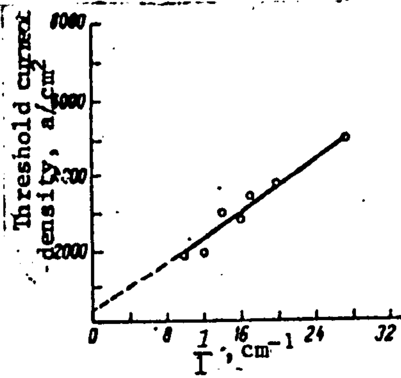


Fig. 1. Dependence of threshold current density on the distance between mirrors

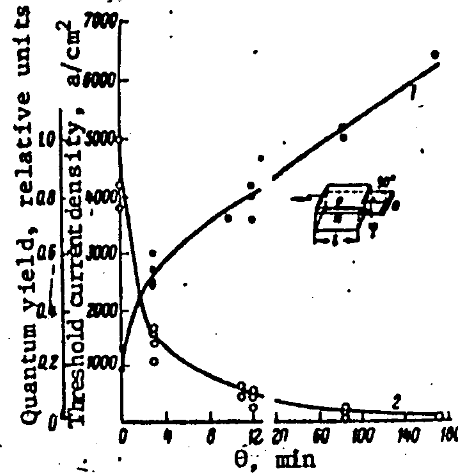


Fig. 2. Dependence of threshold current density (curve 1) (for l = 0.7 mm) and quantum yield (curve 2) on the angle between the p-n junction plane and resonator mirrors

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